MATERIAL SAFETY DATA SHEET

SRM Supplier: National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Mail Stop 2320
Gaithersburg, Maryland 20899

SRM Number: 1640
MSDS Number: 1640
SRM Name: Trace Elements in Natural Water
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SECTION I. MATERIAL IDENTIFICATION

Material Name: Trace Elements in Natural Water

Description: SRM 1640 is intended primarily for use in evaluating methods for the determination of trace elements in fresh water. A unit of this SRM consists of approximately 250 mL of natural fresh water, which has been filtered and stabilized with nitric acid at a concentration of 0.5 mol/L. The solution is preserved in a polyethylene bottle sealed in an aluminized plastic bag to maintain stability.

Other Designations: Nitric Acid (aqua fortis; hydrogen nitrate; azotic acid; engravers acid)

Name	Chemical Formula	CAS Registry Number
Nitric Acid	HNO_3	7697-37-2

DOT Classification: Nitric Acid Solution, UN2031, PG II

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration (mol/L)	Exposure Limits and Toxicity Data
Nitric Acid	0.5	ACGIH TWA: 5 mg/m^3
		OSHA TWA: 5 mg/m^3
		Human, Oral: LD_{LO}: 430 mg/kg

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Nitric Acid
Appearance and Odor: a white to slightly yellow liquid that darkens to a brownish color upon aging and exposure to light; a strong, pungent odor
Relative Molecular Mass: 63.01
Specific Gravity (Water = 1): 1.5027[1]
Solubility in Water: miscible
Solvent Solubility: ether

NOTE: The physical and chemical data provided are for pure nitric acid. The actual behavior of this solution may differ from that of pure nitric acid.

[1] See Certificate of Analysis for the measured density of SRM 1640.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: N/A **Method Used:** N/A **Autoignition Temperature:** N/A

Flammability Limits in Air (Volume %): **UPPER:** N/A
LOWER: N/A

Unusual Fire and Explosion Hazards: Although nitric acid does not burn, it is a powerful oxidizing agent that can react with combustible materials to cause fires.

Extinguishing Media: Use extinguishing media that are appropriate to the surrounding fire. Use a water spray to dilute nitric acid and to absorb liberated oxides of nitrogen.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face shield and other protective clothing.

SECTION V. REACTIVITY DATA

Stability: __X__ **Stable** _____ **Unstable**

Conditions to Avoid: Avoid contact with combustible and other incompatible materials.

Incompatibility (Materials to Avoid): Keep nitric acid away from other acids, combustible materials, halo carbons, amines, bases, oxidizing materials, metals, halogens, metal salts, metal oxides, reducing agents, peroxides, metal carbides, and cyanides.

See Section IV: "Unusual Fire and Explosion Hazards".

Hazardous Decomposition or Byproducts: Hazardous decomposition of nitric acid can produce various nitrogen oxides, including nitric oxide (NO), nitrogen dioxide (NO_2), nitrous oxide (N_2O), as well as nitric acid mist or vapor.

Hazardous Polymerization: _____ **Will Occur** __X__ **Will Not Occur**

SECTION VI. HEALTH HAZARD DATA

Route of Entry: __X__ **Inhalation** __X__ **Skin** __X__ **Ingestion**

Health Hazards (Acute and Chronic): **Nitric Acid:** Nitric acid may be fatal if inhaled, swallowed, or absorbed through the skin. This material causes burns and is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. Inhalation may be fatal as a result of spasm, inflammation, and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting.

Medical Conditions Generally Aggravated by Exposure: Eye disorders, skin disorders, respiratory disorders, and allergies.

Listed as a Carcinogen/Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs		X
By the Occupational Safety and Health Administration (OSHA)		X

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration by qualified personnel. Obtain medical assistance if necessary.

Ingestion: If ingestion occurs, wash out mouth with water. **DO NOT** induce vomiting. Obtain medical assistance immediately.

TARGET ORGAN(S) OF ATTACK: Skin, teeth, eyes, mucous membrane, and upper respiratory tract

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be taken in Case Material is Released or Spilled: Notify safety personnel of spills. Do not touch spilled material. Flood with water. **DO NOT** get water inside container. Cautiously neutralize contaminated surfaces with sodium carbonate. Collect the neutralized material into sealable containers suitable for disposal.

Waste Disposal: Follow all federal, state, and local laws governing disposal. Keep out of water supplies and sewers.

Handling and Storage: Provide local ventilation system to maintain airborne concentrations below the Threshold Limit Value (TLV). Provide approved respiratory apparatus for emergency use. Use an approved filter and vapor respirator when the vapor or mist concentrations are high. Wear gloves and chemical safety glasses where contact with the liquid or high vapor concentrations may occur. An eye wash station and washing facilities should be readily available near handling and use areas. Wash exposed skin areas several times a day with soap and warm water.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *Nitric Acid*, 15 December 2003.